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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/441,119
Filing Date: November 17, 1999
Appellant(s): RICHARDS ET AL.

Kermit Robinson
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed August 22nd 2005 appealing from the Office action mailed April 20th, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

LNBP10 Series LNBP20: LNB Supply and Control Voltage Regulator (Parallel Interface) Data Sheet of ST, September 1998, pp. 1-17

5,893,023	Vizer	4-1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over "LNBP10 Series LNBP20" datasheet (henceforth referred to as LNBP10), published in September 1998 by ST Microelectronics in view of Vizer (US Pat. 5,893,023).

In regards to claim 1 and method claim 7, the LNBP10 datasheet describes a LNB supply and control voltage regulator circuit, comprising a linear amplifier means, which modulates a DC voltage level by an analog AC tone signal for providing power supply (from DC signal) and control (analog AC tone) signals to a remotely located LNB. The linear amplifier means further comprises a control port to which reference voltage indicative of the selected DC voltage level is applied (VSEL); and an input port for receiving a power supply output.

The LNBP10 datasheet discloses that the power can be supplied from a single source supplying 23V or can be supplied from two sources supplying 16V and 23V each, where the VSEL controls the switching the two sources to supply the lowest supply voltage required, thus reducing the power dissipation. Note description in pages 1-2 and figure on page 5.

The LNBP10 requires two power supply sources for providing either 16V or 23V, depending on the required voltage as determined by the VSEL input to the linear amplifier for reducing the power dissipation. The LNBP10 also allows the use of only one source but lacks the ability to reduce power dissipation when using only one supply voltage.

Vizer teaches using a switch mode power supply in a receiver to provide different operating voltage levels required to power to a LNB at the antenna assembly to minimize thermal dissipation within the receiver. The switch mode power supply comprises an input 6, connected to a DC voltage, an output 7. A voltage is delivered to the control input 13 for driving the base of the transistor and therefore the voltage delivered to the control input controls the operation of the switch mode power supply generating an operating voltage of the desired value. Note abstract, column 2, lines 5-21 and column 1, lines 47-53 of Vizer.

It would have been obvious to modify the LNBP10 circuit in view of Vizer's teachings to include a switch mode power supply in order to provide different operating voltages from a single DC voltage source, where the input of the switch mode power supply is connected to the single supply voltage source, and the

control input of the switch mode power supply is coupled to VSEL, in order to regulate the output delivered to the linear amplifier means. The motivation would be to modify the LNBP10 circuit so it uses only one source with reduced power dissipation at the receiver, as taught by Vizer.

In regards to claim 2 and method claim 8, the satellite receiver comprises a low noise block converter of a satellite television system. Note column 1, lines 20-26 of Vizer and description in column 1, page 1 of the LNBP10 datasheet.

In regards to claim 3 and method claim 9, the modified circuit of LNBP10 in view of Vizer's teachings comprises an oscillator for generating analog AC tone signals. Note column 2, in page 1 and page 2, column 1 of the LNBP10 datasheet.

In regards to claim 4, the modified circuit of LNBP10 in view of Vizer's teachings does not disclose the use of buck converter for the switch-mode power supply.

Official notice is taken that the buck converter is a well-known type of DC-DC switch mode power supply used to "step down" the input voltage level to a lower output voltage level.

It would have been obvious to one of ordinary skill to further modify the LNBP10 circuit in view of Vizer's teaching to use a buck converter for the switch mode power supply where the highest required output voltage level is lower than the supply voltage. The motivation is to provide means to "step-down" the input voltage.

In regards to claim 5 and method claim 10, the modified circuit of LNBP10 in view of Vizer's teachings does not disclose the use of boost converter for the switch-mode power supply.

Official notice is taken that the boost converter is a well-known type of DC-DC switch mode power supply used to "step up" the input voltage to a higher output voltage level.

It would have been obvious to one of ordinary skill to further modify the LNBP10 circuit in view of Vizer's teaching to use a boost converter for the switch mode power supply where the lowest required output voltage level is higher than the supply voltage. The motivation is to provide means to "step-up" the input voltage.

In regards to claim 6 the modified system of LNBP10 in view of Vizer's teachings, the linear amplifier comprises a first output port portion (LNBA) and a second output port portion (LNBB), where the output of the linear amplifier is provided at a selected one of the output port portions in response to an output port control signal (OSEL). Note column 1 in page 1, chart in page 3, and truth table in page 4 of the LNBP10 datasheet.

In regards to claim 11, note claims 1 and 3.

Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over "LNBP10 Series LNBP20" datasheet (henceforth referred to as LNBP10), published in September 1998 by ST Microelectronics in view of Vizer (US Pat.

5,893,023) as applied to claim 11 above and in further view of Mammano et al. (US Pat. 5,422,562).

In regards to claim 12, the modified LNBP10 circuit in view of Vizer's teaching lacks the recited limitations in the switch mode power supply.

Mammano et al. shows a standard mode power supply comprising an error amp (34), where the first input is coupled to a reference voltage (V_{REF}) and a feedback input that is responsive to the output of the power supply (20); a pulse width modulation comparator (16) responsive to the output of the error amp for controlling a transistor (14); a transistor (14) where the first input is coupled to the input voltage source (18), the control port is coupled to the PWM comparator (16), and the third terminal is coupled to the inductor (24); an inductor (24) where the first terminal is coupled to the third terminal of the transistor (14) and the output of the linear regulator (V_O) is provided at the second terminal. Note figure 2 in Mammano et al.

It would have been obvious to one of ordinary skill in the art at the time of invention to further modify the LNBP10 circuit modified in view of Vizer to use the switch mode power supply of Mammano et al. in order to provide a switching regulator with an improved dynamic response as specifically taught by Mammano et al. (see column 1, lines 6-9). Further more, only the internal circuit of the switch-mode power supply is modified without changing its interface. Therefore, the switch-mode power supply still comprises an input port to which an input voltage source is connected, a control port, to which a reference voltage

is connected, and an output port, which supplies the regulated output to the linear amplifier.

In regards to claim 14, the PWM of Mammano et al. is a current mode PWM. Therefore the modification of LNBP22 in view of Mammano et al. is a current mode PWM as well. Note column 4, lines 10-13.

In regards to claim 13, the LNBP10 circuit modified in view of Vizer lacks an offset voltage generator coupled between the reference voltage and the first input of the error amplifier.

It is well know that the error amplifier functions by comparing the reference voltage to the feedback input voltage, generating an output signal proportional to the difference, which in turn controls the duty cycle of the PWM comparator to regulate the output voltage. The output voltage is "regulated" when the feedback voltage level equals the reference voltage level, i.e. the output voltage level is at the value determined by the reference voltage level. Therefore the desired value of a "regulated" output is directly proportional to the reference voltage, i.e. to increase the value of a desired output, the reference voltage must be increased. If it is desired that the switch mode power supply regulate a higher voltage to be transmitted to the linear amplifier, an offset voltage can be added between the reference voltage and the first input o the error amplifier.

Therefore it would have been obvious to add an offset voltage generator between the first input of the error amplifier and the reference voltage in order to

increase the output voltage of the switch mode power supply by a predetermined value.

(10) Response to Argument

Applicant argues on page 9, that, because the LNBP10 reference provides a "particular solution for reducing power dissipation in the liner amplifier by selecting a second voltage source having a lower voltage when a lower output voltage from the LNBP10 device is selected", there is no motivation for a different power reduction solution (namely, of reducing power dissipation using one voltage source). The examiner respectfully disagrees. The examiner notes that the LNBP10 reference merely states that a plurality of voltage levels maybe provided to VCC1 and VCC2 pins, while an internal switch switches between the two voltage levels according to the required output voltage. Furthermore, the LNBP10 reference is silent about the number of voltage sources required to provide the plurality of voltage levels. Vizer is relied upon to provide the *plurality* of voltage levels using a *single* voltage source, which the LNBP10 reference is otherwise silent about.

Applicant asserts on page 10, that as a result of the combination of the LNBP10 in view of Vizer's teachings, "would retain the two supply input pins VCC1 and VCC2 of the LNBP10 reference" to which "two separate switch mode power supplies of Vizer would be coupled". Applicant then continues on to argue on page 11, that if two power supplies were not used, the "second of the two

supply input pins VCC1 and VCC2 would have no function at all and be entirely unconnected". The examiner respectfully disagrees. First, the examiner would like to note that the scope of claim 1 does not preclude a second switch mode power supply (i.e. more than one switch mode power supplies) in the system. Secondly, the LNBP10 reference states that the same voltage source output may be coupled to VCC1 and VCC2 supply pins without affecting any other circuit performance. See page 1, LNBP10 datasheet. Since the switched mode supply regulator of Vizer provides the plurality of supply voltage levels according to the required output voltage, the heat losses that would otherwise incur in the LNBP10 is minimized. Therefore contrary to what the applicant states, neither two switched mode power supplies are required, nor are one of voltage supply pins (VCC1, VCC2) left unconnected as a result of the combination.

Applicant also traverses the teachings Vizer reference on page 9 stating that, "Vizer does not contemplate using a switch mode power supply to provide a regulated input voltage to a liner amplifier, wherein the liner amplifier provides an output voltage having the selected DC voltage level and being modulated by an AC tone signal". The examiner would like to point out that LNBP10 reference already contemplates a system using a power supply to provide a regulated input voltage to a liner amplifier, wherein the liner amplifier provides an output voltage having the selected DC voltage level and being modulated by an AC tone signal. The LNBP10 lacks a switched mode power supply to supply the plurality of DC voltage levels, for which Vizer's teachings are relied upon. Therefore examiner

has relied upon Vizer's teachings for teaching the step of using a switched mode power supply for supplying DC voltage level based on a required output level.

Applicant argues on page 9, that, "the LNBP10 reference would not necessarily benefit by the combination with Vizer" because "a switched mode power supply such as in Vizer is more complex than a linear power supply used by the LNBP10 reference and also requires the use of magnetic elements". Applicant's arguments are irrelevant, as none of these factors affect the scope or limitations of claim 1. Applicant continues to argue on page 10 that, "the addition of switch mode power supply as in Vizer might add size and cost". Applicant's allegations that, "the addition of Vizer *might* add size and cost" are baseless and unsubstantiated, and seem to be based on probabilities derived from misplaced contentions. In light of the above arguments, the examiner maintains rejection.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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